

Hoppenrath/Elbrächter/Drebes



# Marine Phytoplankton

Selected Phytoplankton species from  
the North Sea around Helgoland and Sylt

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Selected microphytoplankton species from the North Sea  
around Helgoland and Sylt



E. Schweizerbart'sche Verlagsbuchhandlung (Nägele u. Obermiller) Stuttgart

**Marine phytoplankton** forms the basis of the marine food web. Phytoplankton, while too small to be visible to the naked eye, occurs in the oceans in quantities so large, that under favorable conditions, these microscopic algae can actually be observed on satellite images.

According to NASA, phytoplankton accounts for the production of between 50% and 90% of all oxygen in the air that we breathe, depending on the seasons. In the process of producing oxygen, phytoplankton is one of the largest sinks of atmospheric CO<sub>2</sub>, and a major factor in maintaining a balanced ecosystem which is essential for all life and a healthy planet.

More than 99% of all species inhabiting the oceans depend, either directly or indirectly, on phytoplankton for food.

This publication describes almost 300 phytoplankton species from the North Sea around Helgoland and Sylt in order to aid in their identification. The descriptions in this volume are profusely illustrated by means of approximately 1100 images and 70 line drawings on 85 plates.

The book aims to be a helpful contribution to identify and understand marine phytoplankton of the North Sea ecosystem.

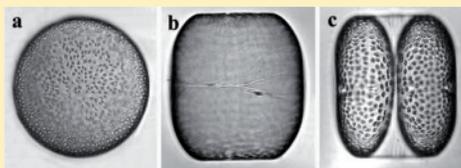


Fig. 11 a–c *Coscinodiscus* spp. a–g: *C. concinnus*. a: Valve view. b: Girdle view, mid cell focus. c: Dimorphic cell pair in girdle view.

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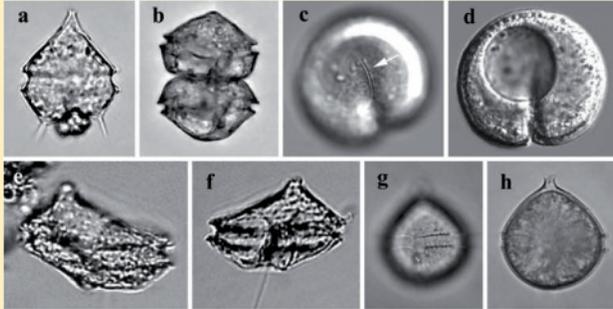


Fig. 59 a-h *Protoperidinium* spp. a: *P. bipes*. b-d: *P. denticulatum*. b: The species typically occurs in cell pairs. c: Apical view, note the slit-like apical pore plate (arrow). d: Mid cell focus, pusule visible. e, f: *P. excentricum*, lateral views. g-i: *P. minutum*. g: Ventral view. h: Mid cell focus.

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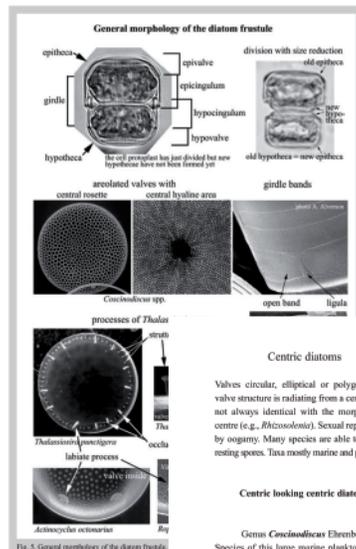


Fig. 5. General morphology of the diatom frustule.

**Centric diatoms**

Valves circular, elliptical or polygonal. The valve structure is radiating from a centre that is not always identical with the morphological centre (e.g., *Rhizosolenia*). Sexual reproduction by oogamy. Many species are able to produce resting spores. Taxa mostly marine and planktonic.

**Centric looking centric diatoms**

Genus *Cocconeis* Ehrenberg  
 Species of this large marine planktonic genus occur as solitary cells. External tubes or processes are absent. The areolate pattern is radial. The valve centre is either hyaline or has a rosette of larger areolae. Labiate processes

developing stage the cells occur single or in pairs. Longitudinal growth combined with the development of inner girdles (hypocingula) does not happen directly after the cell division, but immediately before the next division. Therefore during interphase the cells stay together as pairs inside the mother cell's girdle. This character is shared e.g. with the genera *Melosira*, *Podosira*, *Stephanopyxis*, and *Skeletonema*. In the majority of diatoms the hypocingulum development happens directly after the cell division. Hasle and Sims (1986a) amended the diagnosis of the genus. The type is *C. argus* Ehrenberg.

*Cocconeis concinnus* Smith (Figs. 11a-g)  
 Large, weakly silicified (thin-walled), discoid cells with convex valves, that can be slightly flattened or even slightly depressed in the centre, 110-500 µm in diameter. Bundled rows of small areolae with hyaline lines between

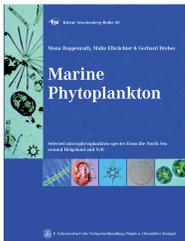


Fig. 17 a-j *Stephanosira* spp. a-j: *S. acuta*. a: Chain with seven cells. b: Chain with a dividing cell. c: Living (top) and dead (bottom) cells over the heteropolar procelion. d: Two connected valves. SEM, note the areolation and the radiating pattern of the labiate processes. e: Valve interior. SEM. f: Valve exterior. SEM, note the areolation and the two fully developed resting spores. g: Two partially (top) and two fully (bottom) developed resting spores. h: Completed resting spore after two divisions. i, j: Resting spores. SEM. k-o: *S. perforans*. k-o: Living cells in a chain. k: Valve exterior view. SEM, note that the areolae are larger on the valve face than on the inside.

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